Likelihood of Future Occurrences

From May to October of each year, Placer County faces a serious wildland fire threat. Most of the County is susceptible to wildland fires. The threat of wildfire and potential losses are constantly increasing as human development and population increases and the Wildland Urban Interface areas expand. Due to its high fuel load and long, dry summers, most of Placer County continues to be at risk from wildfire.

EARTHQUAKE

Placer County lies between two seismically active regions in the western United States. Tectonic stresses associated with the North American-Pacific Plate boundary can generate damaging earthquakes along faults 30 to 100 miles to the west of the County. Extreme eastern Placer County borders the Basin and Range province that entails most of Nevada and western Utah. This area is riddled with active faults that are responsible for and form the boundary between each basin or valley and the neighboring mountain range. "Active" faults, which represent the highest earthquake hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years).

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and causes the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. Seismologists have developed two scales as seen on the following page to quantify the shaking intensity of an earthquake's effects, which is measured by how an earthquake is felt by humans.

Earthquakes can cause structural damage, injury and loss of life, as well as damage to infrastructure networks such as water, power, communication, and transportation lines. Other damage-causing effects of earthquakes include surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, and dam failure.

EARTHOUAKE INTENSITIES WITH APPROXIMATE CORRESPONDING MAGNITUDES

MERCALLI INTENSITY	DESCRIPTION	RICHTER MAGNITUDE				
I	INSTRUMENTAL: detected only by seismographs	3.5				
II	FEEBLE: noticed only by sensitive people	4.2				
	SLIGHT: like the vibrations due to a passing train; felt by people at rest,					
III						
	MODERATE: felt by people while walking; rocking of loose objects,					
IV	including standing houses	4.8				
	RATHER STRONG: felt generally; most sleepers are awakened and bells					
V	ring	4.9 - 5.4				
	STRONG: trees sway and all suspended objects swing; damage by					
VI	overturning and falling of loose objects	5.5 - 6.0				
VII	VERY STRONG: general alarm; walls crack; plaster falls	6.1				
	DESTRUCTIVE: car drivers seriously disturbed; masonry fissured;					
VIII	VIII chimneys fall; poorly constructed buildings damaged					
	RUINOUS: some houses collapse where ground begins to crack, and pipes					
IX	break open	6.9				
	DISASTROUS: ground cracks badly; many buildings destroyed and					
X	railway lines bent; landslides on steep slopes	7.0 - 7.3				
	VERY DISASTROUS: few buildings remain standing; bridges destroyed;					
	all services (railways, pipes and cables) out of action; great landslides and					
XI	floods	7.4 - 8.1				
	CATASTROPHIC: total destruction; objects thrown into air; ground rises					
XII	and falls in waves	> 8.1				

(Source: Math/Science Nucleus.Org website)

Past Occurrences

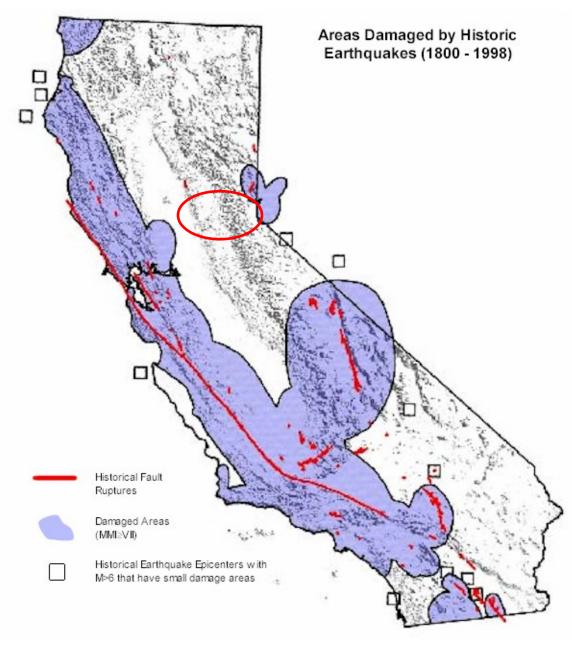
The closest recently active fault in the western Sierra Nevada foothills is the Cleveland Hills fault, which is situated approximately 36 miles northwest of Auburn. This fault was the source of the 1975 Oroville earthquake (Richter Magnitude: 5.7), which was felt strongly in Placer County and neighboring areas. Another potential earthquake source is the Midland Fault Zone on the western side of the Sacramento Valley, where in 1892 an earthquake centered between the cities of Vacaville and Winters caused minor damage in the City of Lincoln.

Placer County itself is traversed by a series of northwest trending-faults that are related to the Sierra Nevada uplift. Although portions of western and eastern Placer County are located in a seismically active region, no known faults actually go through any of the cities or towns. However, the Bear Mountain and the Melones faults are situated approximately three to four miles westerly and easterly from the City of Auburn respectively. It is reported that an estimated 4.0+ Richter magnitude earthquake occurred between Auburn and Folsom in 1908 with an epicenter possibly associated with the Bear Mountain fault. Earthquakes on these faults would have the greatest potential for damaging buildings in Auburn, especially the unreinforced masonry structures in the older part of the city and homes built before 1960 without adequate anchorage of framing and foundations. Similar lower magnitude but nearby earthquakes are capable of producing comparable damages in other Placer County communities.

Additionally, western Placer County may experience ground shaking from distant major to great earthquakes on faults to the west and east. For example, to the west, both the San Andreas fault (source of the 8.0 estimated Richter magnitude San Francisco earthquake that caused damage in Sacramento in 1906, including the State Capitol, the full extent of which was not discovered until the mid-1970s) and the closer Hayward fault have the potential for experiencing major to great events. To the east in Nevada, there are several faults associated with a series of earthquakes in 1954, especially the major (7.1 Richter magnitude) December 16, 1954 Fairview Peak event (about 100 miles east of Carson City). These events caused no damage in Reno, but there was some damage in Sacramento, probably because of the soft soil conditions. It is not clear if any Placer County communities experienced any damage from these events.

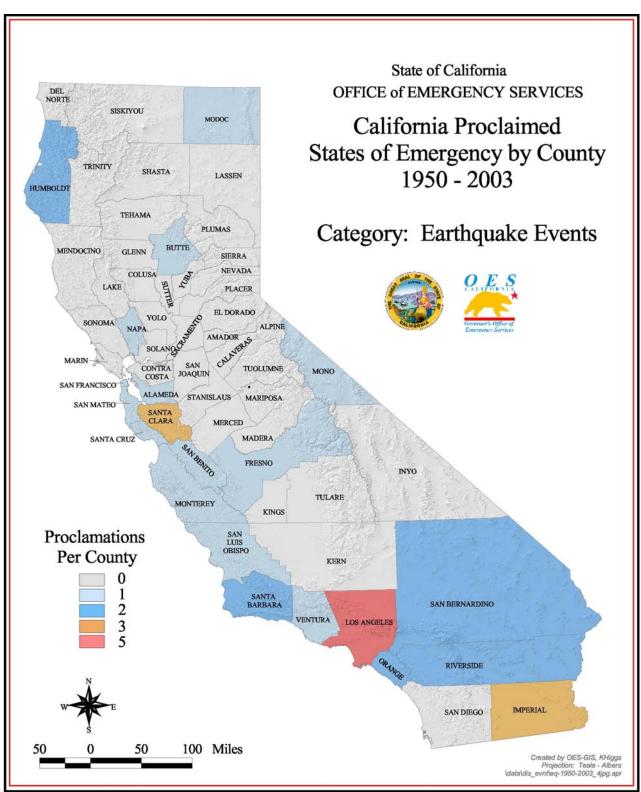
Further analysis using FEMA's HAZUS-MH (nationally applicable loss estimation software) shows that there are several potentially active faults east of the Placer County line in Nevada. The closest faults and estimated maximum earthquakes are the North Tahoe Fault (6.5 estimated maximum magnitude), Incline Village Fault (6.5 estimated maximum magnitude), and the East Tahoe Fault (7.0 estimated maximum magnitude).

The map on the following page obtained from the California Geological Survey's website provides additional historical earthquake information for the Placer County area.



(Source: http://www.consrv.ca.gov/CGS/rghm/psha/ofr9608/index.htm #Faults%20 in%20 California)

The map on the following page illustrates earthquake proclamations by County between 1950 and 2003. During that period, there were no earthquake proclamations for Placer County.



(Source: State of California Draft Multi-Hazard Mitigation Plan)

Likelihood of Future Earthquake Occurrences

Both the San Andreas fault and the closer Hayward fault have the potential for experiencing major to great events. The US Geological Survey recently (February 2004) estimated that there is a 62 percent probability of at least one 6.7 or greater magnitude earthquake occurring that could cause widespread damage in the greater San Francisco Bay area before 2032.

Another potential source for earthquakes in Placer are the faults associated with western edge of the Central Valley, recently defined as the Coast Range Central Valley (CRCV) boundary thrust fault system. Various documents define portions of this little known system as the Midland Fault Zone or the Dunnigan Hills fault where, as noted above, the 1892 Vacaville-Winters earthquake occurred. A southern part of the CRCV system may have been the source of the very damaging 1983 Coalinga earthquake.

The Foothill Fault Zone, a complex series of northwest trending-faults that are related to the Sierra Nevada uplift, and whose activity also is little understood, runs from about Oroville in the north to east of Fresno in the south. This was the source of Oroville's 1975 earthquake (and an earlier event in the 1940s), and subsequent research led to the identification and naming of the zone and questions about the site and design of the proposed Auburn Dam. Earthquakes on nearby fault segments in the zone could be the source of ground shaking in the Placer County area.

The City of Auburn's Safety Element notes, "there is a high potential that the area will be subject to at least moderate earthquake shaking one or more times over the next century." It states further (and as noted above), "The closest identified 'potentially active' faults...are the Bear Mountain and the Melones Faults," which are situated approximately three to four miles westerly and easterly from Auburn.

The results of recently announced (2000) earthquake scenarios based on research associated with historic fault movement and recent (2004) volcanic activity in the greater Lake Tahoe area provides improved knowledge of the mountain-building processes involved and the potential effects of events generated by earthquakes centered beneath or in the vicinity of the lake. However, this information does not necessarily indicate that the area's earthquake hazard is greater than previously understood.

It is known that large (estimated magnitude 7+) earthquakes have occurred historically beneath Lake Tahoe, which is part of the Basin and Range Extensional Province and is characterized by normal faulting on the north and to the west. University of Nevada and Japanese researchers confirmed the existence of the potential hazard affecting lakeside communities in California and Nevada. Using three scenarios, the researchers found that run-up from seiche waves (tsunamilike waves occurring in enclosed bodies of water) caused by earthquakes would be capable of damaging buildings and utilities, particularly if they are accompanied by the subsidence of shoreline areas also due to the shaking.

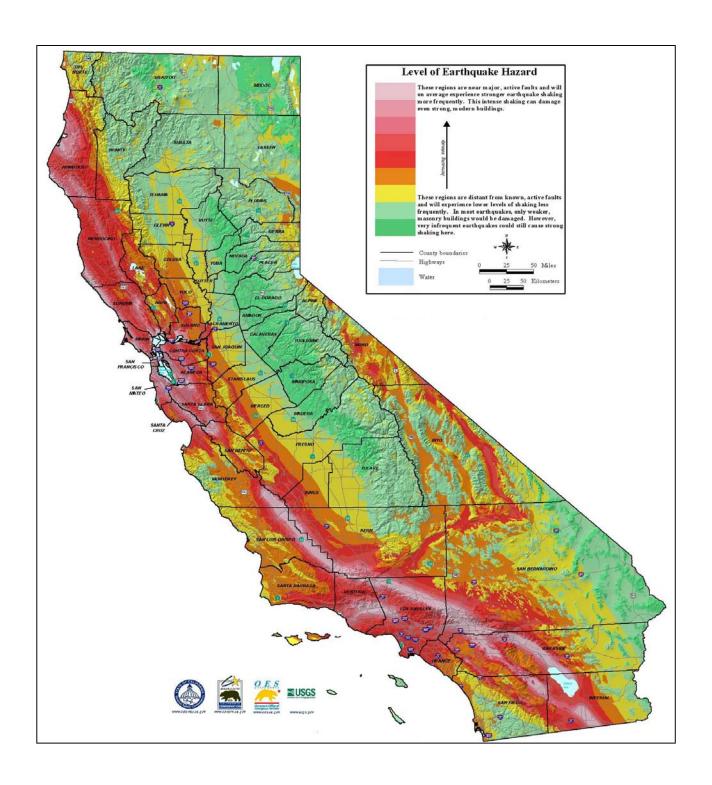
Volcanic magma (molten rock) migrating about 20 miles below the surface of the Sierra Nevada mountains caused a swarm of about 1,600 small earthquakes in late 2003 and early 2004. The 20

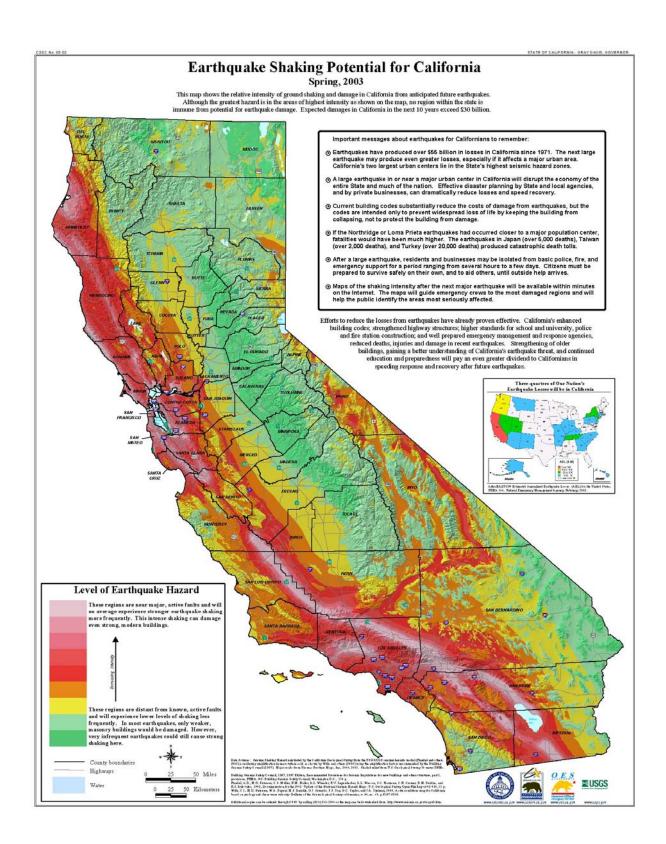
mile depth is about twice as deep as earthquakes caused by normal faulting in the region measured during the last 30 years. Yet, these events are reminders that the Sierra Nevada range is relatively young and is moving to the northwest at a rate of about 12 to 14 millimeters a year.

The 1992 Petrolia (coastal Humboldt County) earthquake, while not felt in Placer County, increased concern about how amplified long period motions from possible major events much closer to Placer County, such as could occur on the San Andreas fault or the Hayward fault, might reach damaging levels and affect Placer County.

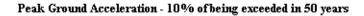
The California Geological Survey's Probabilistic Seismic Hazard Map of California depicts the shaking level that has a 10 percent chance of being exceeded over a period of 50 years (an annual probability of 1 in 475 of being exceed each year).

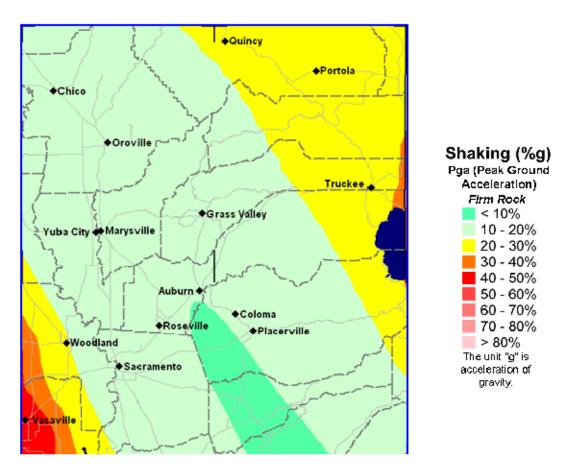
Seismic hazard zone maps and earthquake fault zone maps are used to identify where such hazards are more likely to occur based on analyses of faults, soils, topography, groundwater, and the potential for earthquake shaking sufficiently strong to trigger landslide and liquefaction. The maps from the Draft California Multi-Hazard Mitigation Plan on the following page shows the various levels of earthquake hazards in California. ShakeMaps, that show the distribution of earthquake shaking, help identify potential vulnerabilities to earthquake hazards. From various sources, the other two maps that follow provide additional information on the shaking potential in Placer County.





Interactive Ground Motion Map - Centered on 121° W (Longitude); 39° N (Latitude)





(Source: http://www.consrv.ca.gov/CGS/rghm/pshamap/psha12139.html)

VOLCANO

The Draft California Multi-Hazard Mitigation Plan identifies volcanoes as one of the hazards adversely impacting the state. Of the approximately 20 volcanoes in the state, only a few are active and pose a threat. Of these, Long Valley Caldera and Lassen Peak (see map that follows) are the closest to Placer County. Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away.



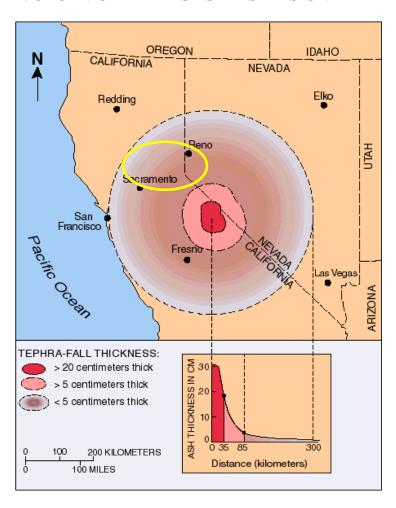
Past Occurrences

The HMPC was unable to find any evidence of volcanic activity within Placer County.

Likelihood of Future Occurrences

Placer County is most susceptible to ash fall from the two closest active volcanoes, Long Valley Caldera and Lassen Peak. The map on the following page illustrates volcanic hazards based on activity in the last 15,000 years. Areas in blue or purple show regions at greater or lesser risk of local volcanic activity, including lava flows, ashfall, lahars (volcanic mudflows), and debris avalanches. Areas in pink show regions at risk of receiving five or more centimeters of ashfall from large or very large explosive eruptions, originating at the volcanic centers shown in blue. An eruption from Lassen Peak has the potential to adversely impact Placer County with ash.

VOLCANIC HAZARDS ASH DISPERSION MAP



AGRICULTURAL HAZARD

Before its rapid population growth in the 1970s and 1980s, Placer County was known as an agricultural and timber-producing county. Agriculture and timber production are still important sectors of the County's economy; however, manufacturing, recreation, and service industries have increased in economic importance. Agricultural production in Placer County primarily is field crops and fruit and nut crops. According to the 2002 Crop report, the 2001 total gross value of agricultural products in the County was \$75,036,970. The total gross value for 2002 is \$76,278,600, representing an increase of \$1,241,630. This report reflects the gross value of agricultural products and not the net income growers receive.

Rice was the leading crop in 2002 with a gross value of \$15,383,800. This is an increase of \$1,499,000 in gross value over 2001, which was due to an increase in planted acreage from 14,298 acres in 2001 to 15,500 acres in 2002. Following rice in total value were nursery products at \$15,080,000; cattle and calf operations at \$12,150,000; timber production at \$9,722,900; and chickens with a gross value of \$6,507,000.

According to the HMPC, agricultural losses occur on an annual basis throughout the County and are usually associated with severe weather events. According to the Draft California Multi-Hazard Mitigation Plan, the primary causes of agricultural disasters in California are associated with drought, freeze, and insect infestations.

Past Occurrences

The Draft state Multi-Hazard Mitigation Plan indicates that Placer County has not experienced any federal agricultural disaster proclamations between 1950 and 1997. The plan also looks at drought, freeze and insect disaster proclamations as indicative of potential loss to crops and provides the following Federal disaster declaration data for Placer County:

- one disaster proclamation for drought between 1950 and 1997
- zero disaster declarations for freeze between January 1991 and December 2003
- zero disaster declarations for insect infestations between 1950 and 2004

Although, there has only been one federally declared disaster declarations (i.e., drought) associated with Agricultural losses in Placer County, other information collected by the HMPC on Agricultural Losses include those identified in the following table. This table indicates that although not warranting Federal disaster status, significant agricultural losses occur in Placer County. Some of these may be duplicative of those appearing in other sections of this document; but the focus here is on those disasters as a result of agricultural losses.

AGRICULTURAL DISASTER REQUESTS

Year	Timeframe	Cause	Location	Acres	Loss	Source
1995	Feb-Mar	Wind, rain, flooding	Newcastle - Roseville	700	\$35,000	CDFA Press Release
	Throughout		Entire county included in			State OES Ltr. To BOS for Disaster
2001	2001	Drought	disaster designation	*	*	Designation Announcement
			State of Nevada disaster			
		Extreme fires &	declaration and Placer included			State OES Ltr. To BOS for Disaster
2001	May-Sept	drought	as a contiguous county.	*	*	Designation Announcement
2001		Drought	Countywide	*	*	Livestock compensation program signup
2002			Countywide	*	*	Livestock compensation program signup
		Excessive rain &				State OES Ltr. To BOS for Disaster
2003	Mar-May	Wheat Strip Rust	Countywide	*	*	Designation Announcement
		Extreme heat &				
		unseasonable	Entire county included in			State OES Ltr. To BOS for Disaster
1 2003	July-Aug	rainfall	disaster designation	*	*	Designation Announcement
		Unseasonable	Entire county included in			State OES Ltr. To BOS for Disaster
2003	Aug-Sept	rainfall	disaster designation	*	*	Designation Announcement
		Series of adverse				Calif. Ag Comm. Disaster Report &
! 2003	Aug-Oct	weather conditons	Western Placer County	46.5	\$100,487	Governor's request to USDA
2003	June-Nov	Late rains	Countywide	98.75	\$203,351	Calif. Ag Comm. Disaster Report

^{*} State OES letter to BOS announcing Disaster Designation and deadline for filing a claim application. No information as to number of growers who filed or dollar amount involved.

Other agricultural disaster requests include those SBA declarations set forth on page 22.

Likelihood of Future Occurrences

As long as severe weather events continue to be an ongoing concern to Placer County, the potential for agricultural losses remain.

HUMAN HEALTH HAZARD

The impact to human health that wildlife, and more notably, insects, can have upon an area is substantial.

West Nile Virus

A recent natural hazard to affect California is the West Nile Virus (WNV). Mosquitoes transmit this potentially deadly disease to livestock and humans alike. WNV first struck the northern hemisphere in Queens, N.Y., in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002, and killed 284 people. Less than one percent of those infected develop severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

Placer County recognizes the potential for WNV to occur within the County and has initiated a public outreach campaign. The Placer West Nile Virus task force has prepared for the possible arrival of WNV the last two years through focused efforts on reducing the mosquito population and educating the public. In 2004, the voters approved extending the Mosquito Abatement District to cover the entire County.

The District's mosquito abatement program consists of a multidisciplinary program with the following components:

- Identify mosquito sources
- Control mosquitoes with biorational products (*B.t.i.*, *Bacillus sphaericus*, methoprene) and when required, other products (Agnique MMF, Golden Bear 1111, and pyrethrum and pyrethroid products)
- Work with property owners to eliminate or reduce mosquito habitat
- Stock mosquitofish where appropriate
- Educate the community
- Conduct disease surveillance

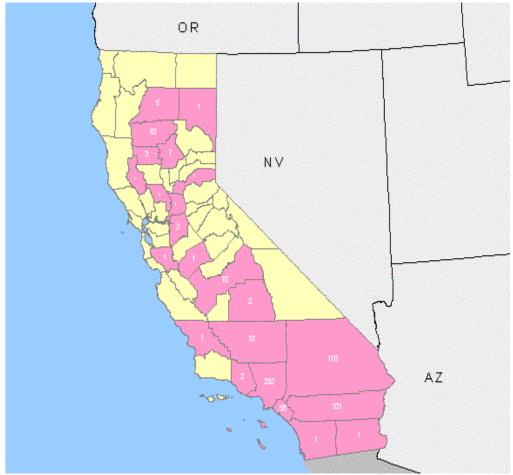
The District maintains records with the dates and street addresses for all birds, mosquito pools, and sentinel chickens that are tested for WNV. It also receives the addresses and date of onset for the majority of the equine cases (some horse owners refuse to provide their addresses), however because of the residents' privacy concerns this information is not included in publicly disseminated documents. This information is available, however, on a need to know basis.

Past Occurrences

WNV was detected on a very limited basis in horses and humans in California in 2003. San Diego County reported 1 veterinary case; Imperial County and Riverside County each reported one human case. According to the California West Nile Virus Surveillance Information Center sponsored by the California Department of Health Services, as of November 2, 2004, a total of 737 human WNV infections have been reported in 23 counties in the State.

By July of 2004, WNV had arrived in Placer County. A dead western scrub jay bird discovered July 22 in Auburn tested positive for the disease. As of November 8, 2004, the California West Nile Virus Surveillance Information Center reported the virus being detected in one human, 47 birds, 26 horses, and three mosquito pools within Placer County. The first human case of WNV in Placer County was diagnosed the week of September 27, 2004. The 56-year old male patient was recovering from meningitis in a local hospital.

The current WNV (last updated 11/08/04) map for California showing number of human cases by county is provided below.



(Source: http://westnilemaps.usgs.gov/ca_human.html)

The Placer County Mosquito Abatement District reported the following West Nile virus (WNV) activity in 2004:

- WNV+ birds (Auburn, Newcastle, Emigrant Gap, Penryn, Granite Bay, Rocklin, Lincoln, Roseville, Loomis, Weimar, Meadow Vista, and unincorporated areas of Placer County west of Lincoln and Roseville)
- 4 WNV+ mosquito pools (Auburn, Sheridan, and unincorporated areas of Placer County west of Roseville)
- 25 WNV+ sentinel chickens (Auburn, Lincoln, Loomis, Sheridan, and unincorporated areas of Placer County west of Lincoln)
- 26 WNV+ Horses (10 deaths/ euthanized) (throughout the county)
- One human case of West Nile Neuroinvasive Disease has been detected in Placer County; the patient is recovering (human case locations are not disclosed)

Likelihood of Future Occurrences

The state will continue their surveillance for the disease in 2005. Based on nationwide trends, the second year is often more severe than the first year. The agricultural nature of much of Placer County combined with the enormous potential for standing water to be present in the area, puts Placer County at future risk of WNV.